

REMARKS

The indication that claims 22-24 and 29 have been allowed (claim 43 depends from claim 23 and is presumed to be allowable therewith) and that claim 45 includes patentable subject matter is acknowledged with thanks.

Claims 13, 15-21, 30-31, and 33-42 were rejected as anticipated by SUZUKI et al. 6,031,957 (the rejection also includes claim 32, but claim 32 depends from claim 1 and cannot be anticipated by this reference; it is presumed that the inclusion of claim 32 in this rejection was inadvertent). Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 13, 16 and 30 include, among other features, a pole between the bridge section optical waveguide and the substrate that supports the bridge section clad layer, where the pole has a width smaller than a width of the bridge section clad layer (see, for example, pole 2a in Figure 3B). The Official Action points to sacrifice layer (silicon terrace) 8 as corresponding to the support section. However, SUZUKI et al. explicitly state that "all of the silicon terrace 8 is removed over the total length" (Figure 2g; column 4, lines 29-33). The sacrifice layer does not appear in the operative device so SUZUKI et al. do not disclose a device with a pole of these claims. Further, the silicon terrace 8 is wider than the bridge section

clad layer and there is nothing in the references to suggest the smaller size claimed herein to the artisan.

The reference must be read as it would be read by one of skill in the art. One of skill in the art would take advantage of the features of the device disclosed in SUZUKI et al. and would not leave the sacrifice layer in the device because SUZUKI et al. tell the artisan to remove it all. The consequences of leaving the sacrifice layer in the device are not disclosed by SUZUKI et al., but one of skill in the art would not presume (as the Official Action presumes) that the consequences would be insubstantial. Such an assumption would have to be (impermissibly) based on hindsight application of that which is only taught by the present inventor.

In the previous response, applicant pointed out that leaving the sacrifice layer in the device would cause the device in SUZUKI et al. to be inoperative for its intended purpose. The Official Action correctly notes that SUZUKI et al. do not explicitly state that the device will be inoperative if the sacrifice layer were left in the device. However, SUZUKI et al. do not state what would happen if layer 8 were not removed and one of skill in the art would presume that features (including removal of layer 8) are disclosed for a reason. The reasons for removal of layer 8 cannot be ignored to make the reference fit the claim.

Claims dependent from claims 13, 16 and 30 are allowable for the same reasons.

Further, claims 20, 31, 39 and 41 provide that the width of the optical waveguide clad layer is wider at both distal ends of the heater corresponding portion than in a center thereof. This is shown, for example, in Figure 13A of the present application. The Official Action points to Figure 1 of SUZUKI et al. for this feature without explanation. Figure 1 and its cross section at Figure 2g show that the width of the clad layer is constant, not wider at the distal ends than at the center. Note that the longitudinally extended gaps 5 are of constant width and note that the distal ends are the same width as the center.

The Official Action refers to this feature when discussing claim 31 and states, "However, in Figure 1 shows a center section wherein a gap exists at element 7. Hence the width is no longer a solid-state structure therefore the width actual size is reduced compare to the width at the end." This is not understood and an explanation is respectfully requested. Heater 6 has two portions 6a and 6b that are separated by an opening 7 (Figure 2g) that does not change the width of the optical waveguide clad layer. What does the opening 7 between heater parts have to do with the width of the optical waveguide clad layer? What is meant by "the width is no longer a solid-state structure?"

Clearly, as seen in Figure 2g, the width is defined by the gaps 5, not the opening 7 between parts of the heater. SUZUKI et al. do not state that the width varies (column 3, lines 44-45 state that the width W is approximately 20 microns) and thus the reference does not disclose this feature of claims 20, 31, 39, and 41.

Claims 1, 3-5, 10-12, 14, and 32 were rejected as unpatentable over SUZUKI et al. in view of IKEDA et al. 5,396,066 (the rejection refers to the same claims as in the §102 rejection; this is presumed to be a typographical error since the explanation mentions the claims listed on the first line of this paragraph). Reconsideration and withdrawal of the rejection are respectfully requested.

Claim 1 includes a sacrifice layer that is glass doped with phosphorus. SUZUKI et al. disclose that the sacrifice layer (8) is silicon and that the clad layer 2B, 4B is quartz (column 3, line 65; column 4, line 3; the material of over cladding 4 is not explicitly disclosed but is reasonably presumed to be quartz as the drawings show the same hatching as for the quartz substrate.) The Official Action indicates that one of skill in the art would be motivated to change the materials disclosed in SUZUKI et al. to those in claim 1 in view of the suggestion in IKEDA et al. to use phosphorous to form electrodes through diffusion methods.

IKEDA et al. use boron and phosphorus to form electrodes 14 (Figures 1a and 2f and column 4, lines 23-46). One of skill in the art reading this reference would see that these electrodes are formed in the cantilever 12. Thus, the artisan may be motivated to form electrodes in cantilevers using diffused boron and phosphorus. However, this is not what is claimed in claim 1. In claim 1, the sacrifice layer is glass doped with phosphorus.

There is nothing in either reference that suggests doping a glass sacrifice layer with phosphorus. The sacrifice layer 8 in SUZUKI et al. is not doped and the oxidized silicon layer 23 (the sacrifice layer, Figure 2i) in IKEDA et al. also is not doped. Why would one of skill in the art dope the sacrifice layer when IKEDA et al. suggests doping a cantilever to form an electrode? What is the relationship between the electrode and the sacrifice layer that would inspire the artisan to do what the Official Action suggests? The sacrifice layer is not an electrode and there is no reason offered in either reference to dope it with anything.

Also, the Official Action indicates on page 9, lines 2-5 that the sacrifice layer is made of a material with a thermal conductivity smaller than that of the substrate, noting that the sacrifice layer 8 is made of silicon and the substrate 1 is made of quartz. However, the thermal conductivity of silicon (the sacrifice layer) is 168 W/m/K while the thermal conductivity of

the quartz substrate (SiO_2) is 1.4 W/m/K. Thus, in SUZUKI et al. the sacrifice layer has a larger thermal conductivity than the substrate, which is opposite the invention of claim 1 in which the sacrifice layer has a smaller thermal conductivity than the substrate.

Further, IKEDA et al. control the electrode doping so that phosphorus would not reach the sacrifice layer (see Figures 1b-d).

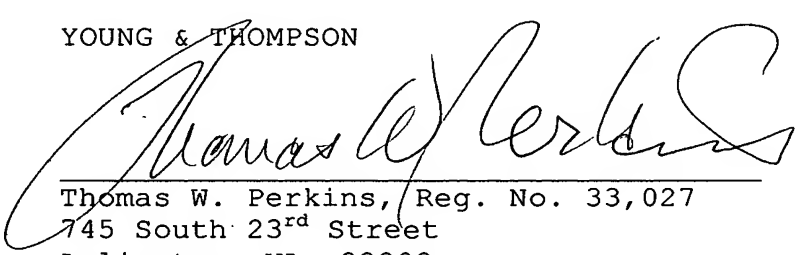
The claims depending from claim 1 are allowable for the same reasons.

In view of the foregoing remarks, it is believed that the present application is in condition for allowance. Reconsideration and allowance are respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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